Reviewer's report

Title: Can testing of six individual muscles contribute to the diagnosis in upper limb diseases?

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Reviewer: Toby Hall

Reviewer's report:

This is an interesting study that sets out to find ways of improving and simplifying the neurological examination of patients with upper limb pain. This is an under-researched area, in need of more studies to improve knowledge of diagnostic ability in this poorly understood field of musculoskeletal medicine. It would be great to have a simple and effective screening tool for neurological deficit in the upper limb. I congratulate the authors for their efforts. I have made some suggestions that could improve the manuscript. The main issue seems to be the selection of patients and conformity to STARD principles.

Major Revisions
Methods
Patients
1st para. Please reword the description of the patients complaints. It's not clear, starting “In 22”
Were patients selected from consecutive referrals? Or were they included in the sample as a sample of convenience?
Was the person selecting patients separate to the examiners?
It would be useful to know more about the patients and their symptoms. Eg duration of symptoms, severity, diagnosis etc.
Did all patients have neurological disorders? Did those with lower limb problems have neurological disorders that could have affected their upper limbs? A few more details would clarify this information. Perhaps this information is included in the other publications related to this study? But this might not be available to all readers of this paper. This is particularly important in a diagnostic accuracy study. If all patients with symptoms had neurological deficits, and asymptomatic limbs had no deficits, then the diagnostic accuracy is inflated. This is probably the case in this study. Conversely accuracy would be reduced if many patients had symptoms, no neurological deficit (eg musculoskeletal disorder), and hence no weakness. It would be important to have a mix of patients with upper limb symptoms, with and without neurological disorders. Only then could the diagnostic accuracy be determined. The principles of STARD would be helpful to follow for a study of diagnostic accuracy, as this paper is.

Methods
As this study was part of a larger study, it is important to know how the sequence of testing occurred. If the examiners were able to conduct other tests prior to the 6 muscle tests, perhaps they had an idea of potential nerve injury and were therefore unintentionally biased?

Under construct validity, is it possible that non-neurological disorders also present with muscle weakness? Eg a painful shoulder may induce weakness of certain movements, but this would not be present in all 6 muscles?

Results
1st para The author should be careful about over amplifying the reliability of their examination. The median result was 0.58, while reliability of some muscle testing was 0.46, which indicates only moderate reliability for some muscles.
Please give 95% confidence intervals for the kappa scores.

Conclusions
I would recommend toning down some of the statements. For example the 4th para is more of a discussion point, rather than a conclusion of the study. The final para should be adjusted or removed, as its not possible to say how prevalent muscle weakness, is based on the current study.

Minor Revisions:
Title
Perhaps the title is not completely descriptive of the study, since weakness by itself is not diagnostic?

Background
Para 3. It’s not certain for all readers what is meant by case definitions. Perhaps an example would clarify for the reader
Para 6 its not clear how the background for testing only 6 muscles arose. The authors suggest that previously 9 muscles, then 8 muscles were required for diagnosis. The authors adapted this to 6, but no explanation is given. A brief explanation would be useful to know why 6 and not 9, or 8 muscles are now required.

Discussion
The discussion section regarding weakness in the 2nd para, the meaning is a little unclear.
Under “standards for comparison” please reference the final sentence of the 2nd para.
Under limitations, the 3rd and 4th para are not so relevant to the present study, more a lament on the state of clinical practice, and so could be left out.
The last para before the conclusion is probably not necessary and could be removed

Table 4
This table is not clear to me. I am not certain why the numbers in brackets are included, as these are from the previous study?

It is not clear from the figures and the description in the table of the exact direction of force that was applied for each muscle test. For example was ECRB wrist extension/radial deviation or pure extension? It would be very helpful for some information about grading

Minor issues not for publication:
Abstract
First para, please correct to …., this study deals with the value….

Conclusion
Please correct to …., but a confirmative diagnosis requires….

Background
Suggest change “approach” for examination
There are a couple of sweeping statements regarding diagnosis in the 2nd para that should be supported by references. Eg electrophysical agents and imaging of no use in diagnosis.

Para 4 Person first language is preferred
Para 5 2nd sentence needs revising “suffering motor and sensory functions” ?
Para 5 and 6 Probably best not to use the word “significant” out of a statistical connotation
Para 6 and remainder of paper Suggest changing greater pectoral for Pectoralis major

Method
What is the experience/qualifications of the examiners?

Discussion
Replace “golden” with gold
Please correct “epikondylitis”
Please correct the final sentence of the 1st para of Upper limb Neuropathy. The meaning is not clear.
The 2nd para

Table 1 Please check spelling eg “tights”. Please change 90# flexion…. to “90# shoulder flexion” Please do the same for the other muscle tests.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published
Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests